

## CLAIMS

What is claimed is:

1. A method of making a frangible, non-toxic projectile comprising:  
melting substantially pure bismuth metal;  
pouring a quantity of said bismuth metal into a mold;  
cooling said quantity of bismuth metal to form a substantially crystalline or poly-crystalline bismuth core;  
swaging said core in a profile die having a bleed hole; and  
electroplating said core so as to form an electroplated core.
2. The method of making a frangible, non-toxic projectile of claim 1, wherein said bleed hole has a diameter of about 0.020 inch to about 0.038 inch.
3. The method of making a frangible, non-toxic projectile of claim 1, further comprising cleaning said core after said swaging and prior to said electroplating.
4. The method of making a frangible, non-toxic projectile of claim 3, further comprising rinsing said core after said cleaning and prior to said electroplating.
5. The method of making a frangible, non-toxic projectile of claim 1, further comprising:  
applying a tarnish inhibitor to the electroplated core;  
drying the electroplated core;  
further swaging the electroplated core; and  
polishing the electroplated core.

6. The method of making a frangible, non-toxic projectile of claim 1, wherein said swaging eliminates substantially a surface irregularity.

7. The method of making a frangible, non-toxic projectile of claim 1, wherein said swaging bleeds off from said core about three to twelve grains of bismuth metal through said bleed hole in said die.

8. The method of making a frangible, non-toxic projectile of claim 1, wherein said electroplating forms a coating having a thickness between about 0.005 inch to about 0.008 inch.

9. The method of making a frangible, non-toxic projectile of claim 8, wherein said coating is selected from the group consisting of:

copper,

brass,

german silver,

tin,

bronze, and

aluminum.

10. The method of making a frangible, non-toxic projectile of claim 1, wherein said electroplating said core comprises further:

immersing said core in an acid activation tank,

then immersing said core in a cyanide strike bath;

then immersing said core in an acid-copper bath; and

then applying a voltage across said acid-copper bath.

11. The method of making a frangible, non-toxic projectile of claim 10, wherein said voltage is applied for a period of between about seven and about fourteen

hours.

12. A frangible, non-toxic projectile comprising:

a core of substantially crystalline or poly-crystalline bismuth; and

a coating electroplatably disposed over said core.

13. The frangible, non-toxic projectile of claim 12, wherein said coating has a thickness of about 0.005 inch to about 0.008 inch.

14. The frangible, non-toxic projectile of claim 12, wherein said coating is selected from the group consisting of:

copper,

brass,

german silver,

tin,

bronze, and

aluminum.

15. The frangible, non-toxic projectile of claim 12, wherein said projectile is releasably disposed proximate to a first end of a cartridge, said cartridge comprising further:

a propellant disposed within said cartridge,

a primer fixably disposed proximate to a second end of said cartridge; and

wherein said primer ignites said propellant upon contact with a firing pin.

16. A system for making a frangible, non-toxic projectile comprising:

means for molding substantially pure molten bismuth metal into a substantially crystalline or poly-crystalline bismuth core;

means operatively associated with the molding means for swaging said core

in a profile die having a bleed hole; and

means operatively associated with the swaging means for electroplating said core to form an electroplated core.

17. The system for making a frangible, non-toxic projectile of claim 16, further comprising means operatively associated with and disposed between the swaging means and the electroplating means for cleaning said core.

18. The system for making a frangible, non-toxic projectile of claim 17, further comprising means operatively associated with and disposed between the cleaning means and the electroplating means for rinsing said core.

19. The system for making a frangible, non-toxic projectile of claim 16, further comprising:

means operatively associated with the electroplating means for applying a tarnish inhibitor to the electroplated core;

means operatively associated with the applying means for drying the electroplated core;

means operatively associated with the drying means for further swaging the electroplated core; and

means operatively associated with the further swaging means for polishing the electroplated core.

20. The system for making a frangible, non-toxic projectile of claim 16, wherein said means for electroplating said core to form an electroplated core comprises further:

acid activation tank immersing means for immersing said core in an acid activation tank,

cyanide strike bath immersing means operatively associated with the acid activation tank immersing means for immersing said core in a cyanide strike bath; acid-copper bath immersing means operatively associated with the cyanide strike bath immersing means for immersing said core in an acid-copper bath; and means operatively associated with the acid-copper bath immersing means for applying a voltage across said acid-copper bath.